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(54) **HIGHLY TRANSPARENT NON-METALLIC CATHODES**

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(57) **ABSTRACT**

A novel class of low reflectivity, high transparency, non-metallic cathodes useful for a wide range of electrically active, transparent organic devices are disclosed. As a representative embodiment, the highly transparent non-metallic cathode of an OLED employs a thin film of copper phthalocyanine (CuPc) capped with a film of low-power, radio-frequency sputtered indium-tin-oxide (ITO). The CuPc prevents damage to the underlying organic layers during the ITO sputtering process. A theory of the invention is presented which suggests that damage-induced states at the non-metallic cathode/organic film interface are responsible for the efficient electron injection properties of the cathode. Due to the low reflectivity of the non-metallic cathode, a non-antireflection-coated, non-metallic-cathode-containing TOLED is disclosed that is 85% transmissive in the visible, emitting nearly identical amounts of light in the forward and back-scattered directions. The performance of the non-metallic-cathode-containing TOLED is found to be comparable to that of TOLEDs employing a more reflective and absorptive cathode consisting of a semi-transparent thin film of Mg:Ag capped with ITO.